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Commentary

What really matters: living longer or living healthier

Comment on "Shanghai rising: health improvements as measured by avoidable mortality since 2000"

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Abstract

The decline in Avoidable Mortality (AM) and increase in life expectancy in Shanghai is impressive. Gusmano and colleagues suggested that Shanghai's improved health system has contributed significantly to this decline in AM. However, when compared to other global cities, Shanghai's life expectancy at birth is improving as London and New York City, but has yet to surpass that of Hong Kong, Tokyo, and Paris. Over the past decade, the reduction in AM of Shanghai is just in line with the international experience in reducing avoidable premature deaths. We suggest that a more elaborate research design is needed to examine the impact of the improvement in Shanghai's health system on its population health status.

Keywords: Health System, Avoidable Mortality (AM), Life Expectancy, Morbidity, Health-Adjusted Life Expectancy (HALE)

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By studying the trend of Avoidable Mortality (AM) in Shanghai during 2000–10, Gusmano and colleagues (1) showed that there is a great reduction in AM among registered residents, and the speed of the decline is comparable to or even better than other global cities, such as New York City and Paris. As the avoidable deaths can be prevented by effective healthcare intervention, Gusmano and colleagues suggested that the decline of AM is largely due to improvement in Shanghai's healthcare system. However, no empirical data was given to demonstrate a direct link for this causal relationship.

Since 1998, when the Shanghai Municipal Center for Disease Control and Prevention was established, Shanghai's healthcare system experienced several major reforms that have led to increased coverage of health insurance and enhanced accessibility to community-based healthcare services. According to the Statistical Bureau of Shanghai (2), in the last 15 years (i.e. 1998–2013) the life expectancy at birth has increased by 5.13 years for registered male residents, from 75.06 years in 1998 to 80.19 years in 2013, but only increased 3.91 years during 1983–98. The life expectancy at birth for registered female residents was 84.79 years in 2013, with an increase of 5.77 years in 1998-2013, compared to an increase of 3.76 years in 1983-98. The life expectancy at birth of registered residents has greatly improved over the past three decades (i.e. 1983–2013). The improvement and the accelerated rate of increase since 1998 may be related to improvement of Shanghai's health system. However, the improvement in life expectancy does not exclusively occur in Shanghai. Figures 1 and 2 provide a cross-city comparison on the average life expectancy at birth of six global cities: Shanghai, New York City, London, Paris, Tokyo, and Hong Kong. Shanghai has lagged behind but has been catching up quickly in the past decade. In 1999, Shanghai's male life expectancy at birth was 76.38 years, which was actually higher than London and New York City but lower than that of Tokyo and Hong Kong. During 1999–2013, Shanghai's life expectancy at birth has continuously improved; and currently, the males' life expectancy seems to converge with other global cities at the level of 80–81 years, except New York City (Figure 1). Shanghai's female life expectancy has been keeping pace with London over the past decade; though ahead of New York City, it is currently falling behind Hong Kong, Tokyo, and Paris. Initially, the gap in life expectancy between Shanghai and some global cities such as Hong Kong, Tokyo, and Paris, was large but it has been narrowing (Figure 2).

Does the improvement in Shanghai's healthcare system contribute to the decline in AM as suggested by Gusmano and colleagues (1), as well as the increase in life expectancy of the registered population? It is far from conclusive. Further empirical data and better research design is needed to support their findings. Shanghai's experience of falling AM and increasing longevity is very similar to that of other global cities. Furthermore, when analyzed within the context of the recent national or global trends, the trends witnessed by these highly-developed global cities, actually are not that exceptional. A global estimation on premature mortality (i.e. mortality under the age of 70) published in *The Lancet* (3) has shown that during 2000–10, China had a reduction of 19% in the premature mortality rate, with a reduction of 36% in the 0–4 age group, 30% in the 5–49 age group, and 15% in the 50–69 age group. And the global premature mortality rate decreased by 19%, with a decrease of 34% in the 0–4 age group, 17% in the 5–49 age group, and 15% in

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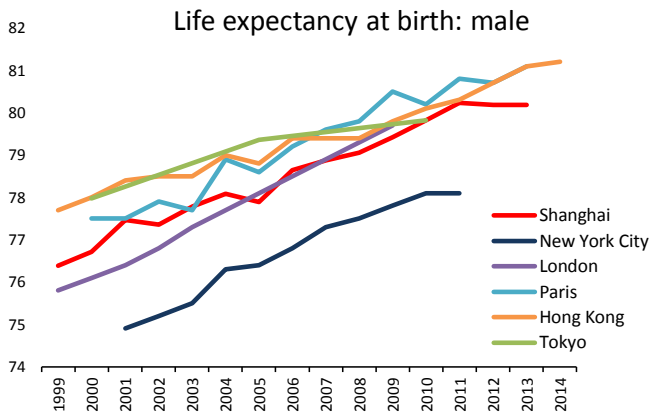

Figure 1. The life expectancy at birth for males in six global cities. Sources: Shanghai Statistical Bureau; The Department of Health and Mental Hygiene of New York City; Statistics and Information Department, Ministry of Health, Labor and Welfare, Japan; London Datastore; National Institute of Statistics and Economic Studies (INSEE), France; Census and Statistics Department of Hong Kong SAR.

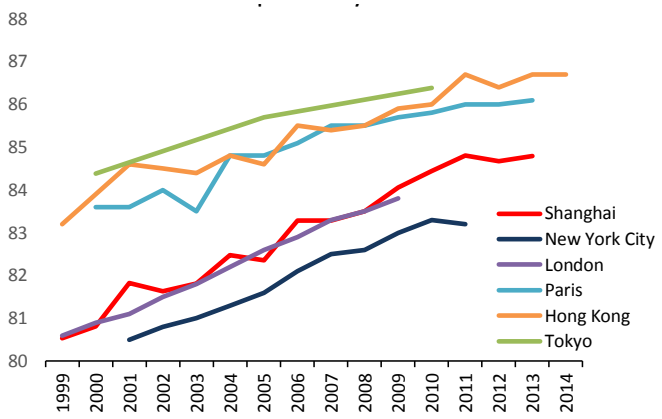

Figure 2. The life expectancy at birth for females in six global cities. Sources: Shanghai Statistical Bureau; The Department of Health and Mental Hygiene of New York City; Statistics and Information Department, Ministry of Health, Labor and Welfare, Japan; London Datastore; National Institute of Statistics and Economic Studies (INSEE), France; Census and Statistics Department of Hong Kong SAR.

the 50–69 age group. This implies that the whole world has also experienced dramatic decline in mortality over the last decade, especially in avoidable premature deaths. Meanwhile, in 2000–12 China's suicide rate has significantly declined by more than 60% (4). This decline also contributes to the decrease of avoidable premature deaths and increase in life expectancy. But there are other suggested reasons for the suicide reduction, for example, the improvement of education and work opportunities due to urbanization, and improvement of quality of life, especially for rural women. Certainly, the improvement of the healthcare system would be able to provide a more timely and effective treatment to those who attempt suicide.

The improvement in the health system might contribute to increase of lifespan but higher degree of disability is expected to appear among people in advanced age. A more challenging issue for our health system is to ascertain "are we living healthier, not only longer". And what has not been explored in the paper of Gusmano *et al.* (1) is that "*whether the substantial investment in Shanghai's health system has made its residents live in better health than before*".

Measuring the improvement of the health system with only one indicator – AM, can be problematic and misleading to some extent. The improved health system may have raised the survival rate, but it could also have left more people living with disabilities and cause a large disease burden on the healthcare system. For instance, behind the rapid mortality decline in the 1970s, the U.S. also witnessed worsening health conditions among middle-aged and older people (5). In Europe, despite the increase in life expectancy, concerns grow that the health system will face increasing challenges as increasing old people suffer from cancer, diabetes, mental disorders (6). The changes in the population's health status should also be included to appraise the performance of the health system (7,8). Gusmano and colleagues (1) have detected the decrease in avoidable deaths, but failed to reveal how morbidity changes behind the declining mortality and increasing life expectancy. As life expectancy increases, the incidence and the duration of suffering disease and disability may increase as well, leading to the morbidity expansion (9–11), which is termed "the failures of the success" by Gruenberg (9). Alternatively, Shanghai may have experienced a "morbidity compression" that the morbidity is compressed to a shorter and later period of the lifespan with increase in the Health-Adjusted Life Expectancy (HALE) (12). But until now, there has been little research on the healthiness of Shanghai's population.

Further investigation into morbidity trends is much needed for better health planning and management in these rapidly-aging global cities. Due to the prolonged low fertility, the aging problem in Shanghai, Hong Kong, and Tokyo is probably more serious compared to other global cities in Western countries. In 2013 about 18% of Shanghai's registered resident population were over age 65 (2) and about 14% of Hong Kong's population were elderly (13). As a large proportion of the population will enter into old age in these cities, the increasing morbidity and disability among the elderly will lead to an increase in government expenditures on healthcare. Nowadays, the so-called "active aging" or "productive aging" is advocated widely and extending retirement age is suggested to increase the workforce (14). However, it should be emphasized that the prerequisite for the success of these strategies is healthy aging. Therefore, the trends in morbidity and disability rates among the elderly are the decisive factor in facing the aging issue.

Apart from traditional indicators – mortality and life expectancy, further exploration on the HALE and Disability-Adjusted Life-years (DALY) for Shanghai and other global cities is also called for. By combining mortality and morbidity, HALE and DALY can better reflect the health progress of Shanghai's residents. Salomon and colleagues (7) conducted a systematic study on HALE for 187 countries. One of their important findings is that HALE increases more slowly than the life expectancy over the last 20 years. They estimate that an increase of one year in life expectancy is only accompanied by an increase of 10 months in HALE (7). They argue that the reduction of morbidity lags behind mortality decline for the past twenty years. The AM used by Gusmano *et al.* (1) can only reflect the health progress in reducing deaths. In terms of reducing morbidity and increasing HALE, it is still

unknown whether Shanghai's rising is still comparable to other global cities.

Shanghai has been witnessing a great reduction in AM and an accelerated increase in life expectancy among registered residents. It is also of interest to learn about the situation for non-registered resident population (i.e. non *hukou* resident). As they may not be as well-covered by the healthcare system as registered residents, if they have similar improvement in AM and life expectancy, then we need to look for other factors which may have contributed to the improvement. Nevertheless, the possible contribution of improvement in the health system should be recognized but needs to be carefully evaluated. Future investigation and comparison in morbidity trends, HALE, and DALY will help assess impacts of the healthcare system on health progress more comprehensively. This will provide illuminating information on health management and planning, especially for these aging global cities.

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Ethical issues

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

PSFY and CM discussed the framework, drafted and revised the manuscript.

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